



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/037,870	10/22/2001	Richard W. D. Booth	034942-258	4801
7590 07/11/2005			EXAMINER	
Robert E. Krebs Thelen Reid & Priest LLP P.O. Box 640640 San Jose, CA 95164-0640			WARE, CICELY Q	
			ART UNIT	PAPER NUMBER
			2634	

DATE MAILED: 07/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Sm

<b>Office Action Summary</b>	<b>Application No.</b> 10/037,870	<b>Applicant(s)</b> BOOTH ET AL.	
	<b>Examiner</b> Cicely Ware	<b>Art Unit</b> 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22-25 is/are allowed.
- 6) ☒ Claim(s) 1-12, 15-21 and 26 is/are rejected.
- 7) ☒ Claim(s) 13, 14, 16 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments, see REMARKS/ARGUMENTS, filed 3/21/2005 with respect to the rejection(s) of claim(s) 1-12, 15, 16, 17, 18, 19, 20, under 35 USC 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of O'Dea et al. (US Patent 5,805,640), Applicant's Admitted Prior Art (Fig. 31, Fig. 33), Soong et al. (US Patent 6,687,238).

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 18 is rejected under 35 U.S.C. 102(e) as being anticipated by Soong et al. (US Patent 6,687,238).

(1) With regard to claim 18, Soong et al. discloses in (Fig. 11) a method of altering a communications signal to reduce an average-to-minimum power ratio

Art Unit: 2634

thereof, comprising: performing conditioning of the communications signal in a first domain to form a modified communications signal; and performing conditioning of the modified communications signal in a second domain to form a further modified communications signal; wherein the first domain is one of a quadrature domain and a polar domain and the second domain is a different one of the quadrature domain and the polar domain (col. 1, lines 42-49, col. 2, lines 50-56, col. 6, lines 13-44, col. 9, lines 25-45).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 3, 4, 5 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Dea et al. (US Patent 5,805,640) in view of Applicant's Admitted Prior Art (Fig. 33).

(1) With regard to claim 1, O'Dea et al. discloses a method of altering a communications signal to reduce an average-to-minimum power ratio thereof, the communications signal being formed using pulse-shaping techniques applied to instances of a pulse of a given form, the method comprising, for at least one signal component (col. 1, lines 61-65, col. 2, lines 55-58, 60-62): setting a desired signal envelope minimum (col. 2, lines 38-40, col. 3, lines 25-26); mapping a digital

Art Unit: 2634

stream of bits onto a symbol constellation to generate a sequence of symbols (abstract, col. 3, lines 7-10, Fig. 6(420)), Fig. 1 (120, 125, 130, 135), Fig. 2 (210, 130)); determining a measure of at least one of magnitude and phase of the communications signal corresponding to the minimum of the communications signal (col. 5, lines 6-10); and if said minimum of the communications signal is less than a desired signal minimum: in accordance with said on of magnitude and phase, forming a scaled corrective pulse (col. 4, lines 34-36); and adding to the signal component the scaled corrective pulse, in timed relation to the signal, to form a modified communications signal having reduced average-to-minimum power ratio (col. 5, lines 39-49).

However O'Dea et al. does not disclose generating signal sample points from the sequence of symbols; identifying two or more signal sample points between which a communications signal is likely to reach a local envelope minimum; using a mathematical model of the communications signal, determining a minimum of the communications signal envelope between the signal sample points and a time at which the minimum between the signal sample points occurs.

However Applicant's Admitted Prior Art (Fig. 33) discloses generating signal sample points from the sequence of symbols; identifying two or more signal sample points between which a communications signal is likely to reach a local envelope minimum; using a mathematical model of the communications signal, determining a minimum of the communications signal envelope between the signal sample points and a time at which the minimum between the signal sample points occurs (Pg. 12, lines 1-3, Pgs. 61-62).

Therefore it would have been obvious to one of ordinary skill in the art to modify O'Dea et al. in view of Applicant's Admitted Prior Art to incorporate generating signal sample points from the sequence of symbols; identifying two or more signal sample points between which a communications signal is likely to reach a local envelope minimum; using a mathematical model of the communications signal, determining a minimum of the communications signal envelope between the signal sample points and a time at which the minimum between the signal sample points occurs in order to counter the impact of filtering on the signal envelope of the modulated signal.

(2) With regard to claim 2, claim 2 inherits all the limitations of claim 1. O'Dea et al. further discloses repeating said identifying, determining, forming, and adding steps to form from the modified communications signal a further modified communications signal (col. 5, lines 57-59, 63-67, col. 6, lines 1-8).

(3) With regard to claim 3, claim 3 inherits all the limitations of claim 1. Applicant's Admitted Prior Art (Fig. 33) further discloses determining a measure includes determining both magnitude and phase of the communications signal between the signal sample points (Pgs. 61-62).

(4) With regard to claim 4, claim 4 inherits all the limitations of claim 3. Furthermore, Applicant's Admitted Prior Art (Fig. 33) discloses in fitting a mathematical function to the communications signal using the signal sample points (Pgs. 61-62).

(5) With regard to claim 5, claim 5 inherits all the limitations of claim 4. Furthermore, O'Dea et al. discloses in (Fig. 6) wherein the communications signal

Art Unit: 2634

is represented with a signal plane having an origin denoting a signal of zero magnitude and determining a measure of magnitude comprises determining within the signal plane a point of intersection between said function and an intersecting line that bears a predetermined relationship to the function and that includes the origin.

(6) With regard to claim 26, claim 26 inherits all the limitations of claim 1.

O'Dea et al. further discloses in (Fig. 3) a method of conditioning a communications signal, comprising assigning mathematical coordinates to two signal samples of a communications signal, said two signal samples being in the temporal vicinity of a low-magnitude event of the communications signal (Fig. 2 (210, 130, 220)); calculating a minimum magnitude of the communications signal using the mathematical coordinates; if the calculated minimum magnitude is less than a predetermined threshold, forming a correction pulse; and combining the correction pulse coherently with the communications signal in the temporal vicinity of the low-magnitude event (Fig. 6 (620, 625), col. 6, lines 18-46).

6. Claims 6-9, 10, 11, 12, 15, 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Dea et al. (US Patent 5,805,640) in view of Applicant's Admitted Prior Art, as applied to claims 1 and 5, in view of Soong et al. US Patent 6,687,238).

(1) With regard to claim 6, claim 6 inherits all the limitations of claim 5. O'Dea et al. does not disclose wherein the number of points is two, and the mathematical function is a spanning line that includes the two signal sample points.

However Soong et al. discloses in (Fig. 11) wherein the number of points is two, and the mathematical function is a spanning line that includes the two signal sample points (col. 9, lines 25-45).

Therefore it would have been obvious to one of ordinary skill in the art to modify O'Dea et al. in view of Soong et al. to incorporate wherein the number of points is two, and the mathematical function is a spanning line that includes the two signal sample points in order to provide for soft limiting which does not cause undesired transients of hard limiting in the analog domain (Soong et al., col. 9, lines 43-45).

(2) With regard to claim 7, claim 7 inherits all the limitations of claim 6. Soong further discloses in (Fig. 11 and Fig. 12) determining a value representing a straight-line distance between signal sample points (col. 9, lines 25-67, col. 10, lines 1-38).

(3) With regard to claim 8, claim 8 inherits all the limitations of claim 7. Soong et al. further discloses in (Fig. 12, Fig. 13, Fig. 14) wherein the value representing the straight-line distance value is computed using a function (col. 9, lines 25-45, 64-67, col. 10, lines 1-60).

(4) With regard to claim 9, claim 9 inherits all the limitations of claim 7. O'Dea et al. further discloses wherein the value 1 is used to represent the straight-line distance value (col. 5, lines 54-61).

It is well known in the art that when a system is normalized all values equal 1.

Therefore, it is inherent that the straight-line distance in a normalized system is

1.

Art Unit: 2634

(5) With regard to claim 10, claim 10 inherits all the limitations of claim 7.

O'Dea et al. further discloses wherein a measure of the phase of the communications signal is represented by a trigonometric function of the phase (col. 3, lines 3-16).

(6) With regard to claim 11, claim 11 inherits all the limitations of claim 10.

O'Dea et al. further discloses in (Fig. 2, (210)) wherein the trigonometric function is computed using said straight-line distance value (col. 2, lines 66-67, col. 3, lines 1-36).

(7) With regard to claim 12, claim 12 inherits all the limitations of claim 11.

O'Dea et al. further discloses wherein the trigonometric function is approximated by: performing multiple comparison operations; and based on results of the comparison operations, selecting one of multiple pre-stored values (col. 4, lines 45-65).

(8) With regard to claim 15, claim 15 inherits all the limitations of claim 1.

However O' Dea et al. does not disclose the communications signal being represented in polar form having a magnitude component and a phase-related component.

However Soong et al. discloses in (Fig. 11) the communications signal being represented in polar form having a magnitude component and a phase-related component (col. 9, lines 25-45).

Therefore it would have been obvious to one of ordinary skill in the art modify O'Dea et al. in view of Soong et al. to incorporate the communications signal being represented in polar form have a magnitude component and a

Art Unit: 2634

phase-related component in order to provide for high efficiency and low distortion and to apply magnitude and phase modulation simultaneously.

(9) With regard to claim 19, claim 19 inherits all the limitations of claim 6.

O'Dea et al. further discloses in (Fig. 6) wherein the intersecting line is orthogonal to the spanning line. O'Dea et al. does not explicitly disclose an intersecting line orthogonal to the spanning line, however O'Dea et al. does disclose channel symbols that are placed 45 degrees apart from each other therefore if the spanning line is a straight line between two symbols that are across from each other then the intersecting line will be orthogonal to the spanning line.

(10) With regard to claim 20, claim 20 inherits all the limitations of claim 6.

Applicant's Admitted Prior Art further discloses in (Fig. 31 and Fig. 33)) wherein the signal sample points are located in various distances from the origin in the complex plane, and wherein identifying, in real-time, two signal sample points between which the communications signal is likely to fall below the desired signal minimum comprises: dividing a straight-line distance along a transition line between the two signal sample points into two ratioed portions based on a point of intersection of the transition line with a normal passing through the origin.

**Figure 31** Illustration of the method used to calculate the phase of the corrective pulses) in patents 5,805,640 and 5,696,794. The signal transitions from symbol  $k$  to symbol  $k+1$ . The so-called phase rotation in this example is  $11-n14 = 3\Delta 4$ . The phase of the correction pulses) is thus  $\%4 + 3*8 = 518$ . The correction vector is orthogonal to a straight line drawn between symbols  $k$  and  $k+1$ .

(11) With regard to claim 21, claim 21 inherits all the limitations of claim 6.

Soong et al. further discloses in (Fig. 11 and Fig. 13 (1360)) generating signal sample points is performed using a digital filter (col. 9, lines 25-45, col. 10, lines 39-41).

***Allowable Subject Matter***

7. Claims 13, 14, 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: The instant application discloses a method of altering a communications signal to reduce an average-to-minimum power ratio thereof, the communications signal being formed using pulse-shaping techniques applied to instances of a pulse of a given form. Prior art references show similar methods but fail to teach: **“deriving from said points a line segment lying within a first quadrant of the signal plane, wherein the comparison operations compare a slope of the line segment with multiple predetermined slopes”, as in claim 13, and “deriving from said points a line segment lying within a first quadrant of the signal plane, wherein the comparison operations comprise applying successive rotations to the line segment and after each rotation, applying a binary criterion to a location of the line segment in the complex plane”, as in claim 14; “wherein phase is the phase-related component, and further comprising, during a time interval in which the phase of the communications signal changes from a first value to a second value,**

Art Unit: 2634

**interpolating between actual phase values and a line extending between the first value and the second value”, as in claim 16; “wherein the signal component is phase-related, and further comprising: adding to the signal component two corrective pulses that together have a negligible effect on the signal component outside a limited period of time”, as in claim 17.**

8. Claims 22-25 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter: The instant application discloses a method of altering a communications signal to reduce an average-to-minimum power ratio thereof, the communications signal being formed using pulse-shaping techniques applied to instances of a pulse of a given form. Prior art references show similar methods but fail to teach: **“specifying a time interval, said time interval not dependent on a transition between a given symbol and a successive symbol in said sequence of symbols”, as in claim 22, “one or more perturbation instances occurring at an instance other than  $t=kT + T/2$ ”, as in claim 24.**

### ***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cicely Ware whose telephone number is 571-272-3047. The examiner can normally be reached on Monday – Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone numbers for the organization where this application or proceeding is

Art Unit: 2634

assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

*Cicely Ware*

cqw  
June 27, 2005



**STEPHEN CHIN**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**